



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/955,810	09/19/2001	Yoshiyuki Tanaka	09792909-5188	1062

7590 01/03/2003

LEWIS T. STEADMAN, SR., ESQ.
HOLLAND & KNIGHT LLP
55 WEST MONROE STREET
SUITE 800
CHICAGO, IL 60603

EXAMINER

LEE, CALVIN

ART UNIT

PAPER NUMBER

2825

DATE MAILED: 01/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/955,810

Applicant(s)
TANAKA et al.

Examiner
Calvin Lee

Art Unit
2825



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9/19/01 is/are a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☒ All b) ☐ Some* c) ☐ None of:

1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ | 6) <input type="checkbox"/> Other: |

OFFICE ACTION

Drawings

1. The drawing Fig. 4B is objected to as failing to comply with 37 CFR 1.84(p)(5) because it does not include the P-TEOS layer **15** mentioned in the description, page 12.
2. Figures 6-11 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 U.S.C. § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in a patent granted on an application for patent by another filed in the US before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 37 of this title before the invention by the applicant for patent

4. Claims 1-3 are rejected under 35 U.S.C. 102(e) as being anticipated by *Jang* (US 6,165,915).

Jang discloses a method for producing a semiconductor device, comprising the steps of:

- forming an interlayer insulating film **19** having an FSG (fluorine-doped silicate glass) layer **14** overlying an aluminum wiring **12** and a USG (undoped-silicate glass) layer **16** formed thereon
- forming an insulating layer **18** on the USG layer [Fig. 1 and col. 7]
- planarizing the insulating layer by CMP [Fig. 2 and col. 8]

Although *Jang* does not explicitly teach or suggest the USG layer being formed at a temperature higher than that of the FSG layer, *Jang* at least teaches forming both FSG and USG layers at a temperature of about 380 to 420°C (meets claim 2).

Moreover, *Jang* discloses in detail the two layers' processes. For example, the FSG layer is formed by applying [col. 7, lns. 1-5] a silane flow rate of about 30 to 40sccm, an oxygen flow rate of about 100 to 120sccm, and an argon flow rate of about 30 to 50sccm. Now compare those flow rates with what being applied to form the USG layer [col. 7, lns. 49-65]: silane (130 to 170sccm), oxygen (150 to 250sccm), and argon (100 to 150sccm). Since the gases flow rates are applied more in the USG film formation, the film forming temperature of the USG layer is inherently higher than that of the FSG layer.

Furthermore, Examiner takes the Office Notice of the use of different film forming temperature in a semiconductor processing art is notoriously well known.

5. Claims 4-5 are rejected under 35 U.S.C. 102(e) as being anticipated by *Jang* (US 6,180,540).

Jang discloses a method for producing a semiconductor device including formation of an interlayer insulating film having an FSG (fluorine-doped silicate glass), comprising the steps of:

- removing a surface layer **14b'** of an FSG layer **14** by sputtering subsequent to the formation of the FSG layer in a process chamber [Fig. 3 and col. 7]
- forming an insulating layer **18** on the FSG layer [Fig. 4 and col. 9]
- planarizing the insulating layer by CMP [Fig. 2 and col. 8]

Conclusion

6. The prior arts made of record and not relied upon are considered pertinent to applicant's disclosure: *Annapragada et al.* (US 6,028,013) discloses a SiON sandwiched between an underlying FSG layer **120** and a PSG oxide **140** [Fig. 4 and col. 5]; *Abdelgadir et al.* (US 6,274,933) discloses a removal of a surface layer of an FSG layer prior to a formation of an USG layer [Fig. 1 and 3]; and *Tsai et al.* (US 6,410,106) discloses an unbiased-unclamped FSG layer **108** sandwiched between an underlying biased FSG layer **106** and an oxide **110** [col. 3].

7. Any inquiry concerning this communication from the Examiner should be directed to *Calvin Lee* at 703-306-5854, Monday to Thursday, from 7 to 5 (Eastern Time). If attempts to reach the examiner by telephone are unsuccessful, Art Unit 2825's Supervisory Patent Examiner *Matthew Smith* whose telephone number is 703-308-1323

Any inquiry relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0596. The fax phones are (703) 872-9318 for regular communications and (703) 872-9319 for After-Final communications.

CL

C. Lee
CALVIN LEE
PATENT EXAMINER

December 23, 2002